

**Notice of Allowability**

Application No.

10/501,548

Examiner

Henry S. Hu

Applicant(s)

KONO ET AL.

Art Unit

1713

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment of September 13, 2005.
2. ☒ The allowed claim(s) is/are 1,2 and 5-11.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

### **DETAILED ACTION**

1. It is noted that this application is a **CIP of 10/046,703, now US Patent No. 6,709,464**
- B2.** Applicants' amendment filed on September 13, 2005 was received. Applicants' **terminal disclaimer** filed on September 13, 2005 has been received and approved to overcome the **ODP rejection**. **Claims 3 and 4 were amended** so as to overcome the **101 double patenting rejections** over US patent No. 6,709,464 to Kono et al.

As discussed earlier, this application repeats a substantial portion of prior Application No. 10/046,703, filed on January 17, 2002, and adds and claims additional subject matter not presented in the prior application. The Examiner so far still has not found the support for **Claims 1-2 and 5-11** inside the parent application regarding the power factor of X. Therefore, **only the priority date of January 17, 2003 (PCT/JP03/00331) is granted.** **Claims 1-2 and 5-11 are now pending** with one independent claim (Claim 1). An action follows.

2. Claim rejections under 35 USC 103 in the previous Office Action dated June 13, 2005 are now removed for the reasons given in paragraphs 3-9 thereafter.

### ***Allowable Subject Matter***

3. Claims 1-2 and 5-11 are allowed.

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4. The following is an examiner's statement of reasons for allowance: The above claims 1-2 and 5-11 are allowed over the closest references:

5. *The limitation of parent Claim 1 of present invention relates to a fluorine-containing copolymer from tetrafluoroethylene (70-95 wt%), hexafluoropropylene (5-20 wt%) and optionally perfluoro vinyl ether (0-10 wt%). The copolymer has (A) a melt flow rate of 30 (g/10 minutes) or more, (B) a volatile content index of 0.2 wt% or less, and (C) a stress relaxation modulus  $G(t)$  (unit:  $\text{dyn/cm}^2$ ) which satisfies the following formula at  $t = 0.1$  second when measured at  $310^\circ\text{C}$ :  $G(0.1) > 7 \times 10^6 \times X^{1.62} - 3000$  where  $X$  is the melt flow rate (unit: g/10 minutes). See other limitations of dependent Claims 2 and 5-11.*

6. This application 10/501,548 is a CIP of its parent application 10/046,703, now US Patent No. 6,709,464 B2. The only difference between parent Claim 1 of both cases is on the power factor of  $X$  (melt flow rate). In view of the Applicants' statement on page 4 of Remarks, Patent No. 6,709,464 B2 to Kono et al. cannot be used as a prior art at all for 102 and/or 103 rejections. Additionally, the Applicants have also provided a terminal disclaimer in this regard.

With respect to 103 rejection for this current case, the secondary reference Blair (US 5,703,185) may have taught that in making copolymers of TFE/HFP/PVE to be melt extruded or melt draw (column 1, line 19-20; column 2, line 16-17) at higher rate, it would be advantageous to prepare copolymers having a higher stress relaxation so as to have less or no stress built-

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up (abstract, line 1-4; column 2, line 12-25; column 1, line 19-20). By doing so, the products (TFE/HFP/PEVE is better than TFE/HFP/PPVE) would exhibit no melt fracture and would also have good flex life (column 2, line 20-23). It is noted that even the powder factor for X (melt flow rate) is changed from -1.6143 to -1.62, the stress relaxation modulus would become different but with only a little lower. However, the primary reference Kono for this 103(a) rejection cannot stand.

7. As discussed in the previous **102/103 rejection in its parent case 10/046,703**, the primary reference **Blair (US 5,703,185)** only discloses that a fluorine-containing terpolymer obtained from tetrafluoroethylene, hexafluoropropylene and perfluoro(ethyl vinyl ether) can be extruded at higher rates than corresponding copolymers containing perfluoro(propyl vinyl ether), wherein the HFP content is 10.0-13.3 wt% with HFPI value measured at 3.13-4.16, while the PEVE content is 0.6-1.40 wt%. Although **melting point range of 243-253 °C, melt viscosity range of  $0.5-50 \times 10^3$  Pa.s., and MIT Flex Life of 5150-15400 cycles to break** have been reported, Blair (185) does not teach or fairly suggest the claimed melt flow rate, volatile content index, as well as the stress relaxation modulus fitting the claimed  $G(0.1)$  formula. It is noted that **even the terpolymers of TFE/PPVE/HFP may be polymerized with the claimed ratio of monomers; some individual properties may be different due to the effect of somewhat a little different process and reaction conditions. Therefore, it is rare to have a combination of all the three properties to be overlapped the claimed numbers of present invention as the Applicants pointed out on page 4 of the amendment.**

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With respect to the other two 102/103 rejections for **Claims 1-9 and 1-6** as well as the 103 rejections for **Claims 7-9 for the parent case**, the primary reference **Blair (EP 789,038 A1)** only discloses that a fluorine-containing copolymer can be obtained by aqueous polymerization process of tetrafluoroethylene and hexafluoropropylene, and the use of HFP can be offset by a small increase in the amount of fluorinated vinyl ether to achieve satisfactory toughness. Other primary reference **Nakagawa (US 4,552,925)** only discloses that mixture of fluorine-containing copolymers can be obtained from tetrafluoroethylene and 5-20 wt% of hexafluoropropylene, which has the specific melt viscosity at  $1 \times 10^4 - 60 \times 10^4$  poise and a melt flow ratio being at least 3.5.

8. In a close examination, both Blair (038) and Nakagawa do not teach or fairly suggest the claimed melt flow rate, volatile content index, as well as the stress relaxation modulus fitting the claimed  $G(0.1)$  formula. The key issue is that present invention requires a combination of all the three properties of **melt flow rate (X)** of 30 (g/10 minutes) or more, a **volatile content index** of 0.2 wt% or less, and a **stress relaxation modulus  $G(t)$**  so as to satisfy the equation of  **$G(0.1) > 7 \times 10^6 \times X^{-1.62} - 3000$** .

In a close examination, the seven references cited in the **international search report for Applicants' PCT/JP03/00331 (now WO 03/059970 A1 to Kono et al.)** are cited as "A" references since all fail to teach or fairly suggest such a combination of limitations.

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The present invention has shown in examples along with some comparative examples for unexpected results in additives for hydrogenated resins (see pages 19-30 for **examples 1-4** along with its comparative control examples 1-5, and **Tables 1-2**). Therefore, the above references, in combination or alone, fails to teach or fairly suggest the limitation of present invention.

9. After further examination and search, the examiner found the following prior art did not teach the claimed limitation: **Carlson (US 4,029,868)** only discloses the preparation of a terpolymer of tetrafluoroethylene, hexafluoropropylene and perfluoro(propyl vinyl ether) or perfluoro(ethyl vinyl ether) (abstract, line 1-4). Although the monomer ratio may be overlapping the claimed numbers, Carlson fails to teach or fairly suggest a combination of all the three properties of **melt flow rate (X)** of 30 (g/10 minutes) or more, a **volatile content index** of 0.2 wt% or less, and a **stress relaxation modulus G(t)** which satisfies  $G(0.1) > 7 \times 10^6 \times X^{-1.62} - 3000$ .

**Hartwimmer et al. (US 4,262,101)** only discloses the preparation of a thermoplastic terpolymer of tetrafluoroethylene, hexafluoropropylene and perfluoro(alkyl vinyl) ether (abstract, line 1-8). Although the monomer ratio may be overlapping the claimed numbers, Carlson fails to teach or fairly suggest a combination of all the three properties of **melt flow rate (X)** of 30 (g/10 minutes) or more, a **volatile content index** of 0.2 wt% or less, and a **stress relaxation modulus G(t)** which satisfies  $G(0.1) > 7 \times 10^6 \times X^{-1.62} - 3000$ .

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10. The key issue, regarding a combination of all the three properties of **melt flow rate**, **volatile content index**, and **stress relaxation modulus**  $G(t)$  which satisfies  $G(0.1) > 7 \times 10^6 \times X^{-1.62} - 3000$  in the copolymer or terpolymer made from **tetrafluoroethylene**, **hexafluoropropylene** and **optionally perfluoro vinyl ether**, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

11. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the independent and amended **Claim 1** is allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending dependent **Claims 2 and 5-11** are passed to issue.

12. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The **fax** number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, art unit 1713, USPTO

October 26, 2005



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